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## OBITUARY NOTICE OF EDWARD MILLER, CIVIL ENGINEER.

*Prepared at the request of the American Philosophical Society, and read at a meeting of the Society, April 5, 1872.*

By SOLOMON W. ROBERTS, Civil Engineer.

Edward Miller was born in Philadelphia on the 6th of January, 1811.

He was the third son of William Miller, who was the Secretary of the Philadelphia Marine Insurance Company, and had been Commissioner of the Revenue of the United States at the City of Washington. He was a gentleman of the old school, remarkable for his punctilious politeness, and for a high sense of honor; and was held in high esteem by many prominent citizens of Philadelphia, and in particular by Mr. Nicholas Biddle, with whom he was very intimate. Mr. William Miller and his family were connected with the first Presbyterian Church of Philadelphia for many years.

Edward Miller was educated at the University of Pennsylvania, where he graduated, with Mathematical Honor, when seventeen years of age. Immediately afterwards he entered the Engineer Corps on the Lehigh Canal, of which Canvass White was the Chief Engineer. Mr. White had been one of the Principal Engineers of the Erie Canal of New York, and he was a gentleman of fine character and much experience. He had made pedestrian tours along the lines of the principal canals of Great Britain, and he was a man of sterling integrity and of great industry. When Edward Miller joined the corps, the Resident Engineer was Sylvester Welch, a man of remarkable energy of character, who planned the Portage Railroad and directed its construction across the Allegheny Mountain, and who was afterwards the Chief Engineer of the State of Kentucky. With him was his brother, Ashbel Welch, since the Chief Engineer of various important works in New Jersey, and for several years, until the leasing of the lines, the President of the United Companies of that State. On the Lehigh at the same time were W. Milnor Roberts, now the Chief Engineer of the Northern Pacific Railroad; Solomon W. Roberts, now Chief Engineer and Superintendent of the North Pennsylvania Railroad; A. B. Warford, Geo. E. Hoffman, Benjamin Aycrigg, and several other well known engineers. It was a good school.

Canvass White had been an officer of volunteers in the war of 1812, and had been badly wounded at Fort Erie. He was a strict disciplinarian, and set a fine example of conscientious discharge of duty, even when suffering from ill health and much bodily weakness. Henry Clay, when recommending him for Engineer of the Chesapeake and Ohio Canal, said: "No man is more competent, no man more capable; and while your faith in his ability and fidelity increases, your friendship will grow into affection." He died in 1834 of pulmonary disease, when 44 years of age, and is buried at Princeton, New Jersey, where he had resided as Chief Engineer of the Delaware and Raritan Canal.

The principal manager of the business of the Lehigh Canal and Navigation Company at that time, was Josiah White, a member of the Society of Friends; a man whose abilities and great public services in developing the resources of Pennsylvania, were worthy of a more fitting memorial than they have yet received.

From the time when Edward Miller joined the corps at Bethlehem, on the Lehigh, in 1828, until the canal was completed in the following year, he was much liked by his comrades, and an intimacy grew up between him and the writer of this notice, which lasted without interruption until his death, a period of more than forty years. In the autumn of 1829, they entered together the service of the State of Pennsylvania, on the western division of the State Canal, of which Sylvester Welch had been appointed the Principal Engineer.

That work was finished in December, 1830, and early in 1831 Edward Miller went abroad and passed some months in England, where he carefully examined the Liverpool and Manchester, the Cromford and High Peak, and other railways in Great Britain. He was provided with excellent introductory letters, and he acquired a large amount of valuable professional knowledge. Soon after his return home, Sylvester Welch, who had become the Principal Engineer of the Portage Railroad over the Allegheny Mountain, appointed Edward Miller to be his Principal Assistant in charge of the Machinery of the Inclined Planes. Mr. Miller designed the stationary engines and other machinery for ten inclined planes, and superintended their construction in Pittsburg. The plans were novel and ingenious, and the rapid manner in which the planes on the mountain were worked, as compared with those elsewhere, showed their great superiority. In the spring of 1834 the railroad over the mountain was opened for public use, the rise from the canal-basin at Hollidaysburg to the summit being 1,400 feet in a little over ten miles. The work attracted much notice, and many persons of distinction visited it. It served its purpose until it was superseded by the improved line of the Pennsylvania Railroad.

Throughout his career, Edward Miller illustrated the advantages of literary and scientific training to a man of business. He surrounded himself with good books and made good use of them. He turned his attention to Geology, and studied it with reference to its influence upon topography, and upon the contour lines of the country in which he was engaged in railroad explorations and locations, and especially with reference to the region of the Allegheny Mountains in Pennsylvania, of which he traced a crest line for more than forty miles. Soon after he grew up to manhood he wrote an essay on this subject for publication.

The first work of which he had the independent charge as Chief Engineer, was the Catawissa Railroad. At that time locomotive engines had been but a few years in use for miscellaneous traffic; they were much lighter and less powerful than those now used, and high speeds and long trains were very little known. The ponderous engines, weighing thirty

or forty tons, with steel tires and steel fire-boxes, burning anthracite coal, and rushing along over varying grades with a speed and a power which continue to impress the imagination even of those whose daily duty it is to direct their course, had then no existence.

The Catawissa Railroad has a summit-tunnel about 1,200 feet long, excavated through rock. The rise from the Susquehanna at Catawissa to the tunnel on the head-waters of the Little Schuylkill, is very nearly 1,000 feet in about thirty miles. Mr. Miller fitted his line to the ground with very great care, and in such a way that the road has no grade exceeding thirty-three feet in a mile, so as to economize locomotive power to the greatest possible extent. This necessitated the building of several very high bridges to carry the grade across lateral ravines entering the main valley. This road continues to be in successful use. The location was a very bold one, nothing like it having been attempted in the country before, and it showed a very considerable degree of originality and self-reliance on the part of the young engineer who made it.

In June, 1836, while living at Catawissa, Mr. Miller was happily married to Miss Jessie Patterson Imbrie, of Philadelphia. His wife survives him with a large family of children, and their eldest son, Mr. James Imbrie Miller, now holds a high position in British India, as Chief Engineer of the Government Railways in Rajpootana, a large district of Central India, with the rank of Lieutenant-Colonel of Engineers.

Soon after his marriage, Edward Miller was, for some time, the Chief Engineer of the Morris Canal of New Jersey.

Before the completion of the Catawissa Railroad, he left it to become Chief Engineer of the Sunbury and Erie Railroad Company, of which Nicholas Biddle was then the President. He proceeded to explore the country between Sunbury and Erie, much of which was a wilderness. It was said at the time, that in the wildest part of it there was but one house near the line for sixty miles. A considerable time was occupied in preliminary surveys, but the construction of the work did not go on until long after, on account of the failure of the United States Bank and the temporary collapse of credit that ensued.

The people residing in the southern tier of counties in the State of New York, were resolutely bent on having a railroad from the Hudson River to Lake Erie, to rival the Erie Canal. A charter was obtained and the work undertaken. Thus arose the New York and Erie Railroad Company, which has had such an extraordinary history since, a history which, to one familiar with it, seems like a romance.

By its charter the company was prohibited from locating any part of its road outside of the territorial limits of the State of New York. The long line was cut up into several parts, with independent Engineers upon each, and confusion followed as a matter of course. Edward Miller was employed as a Consulting Engineer to write a report upon what was going on. This he did so much to the satisfaction of the Board of Directors, that he was soon after appointed Chief Engineer of the whole line from

the Hudson to Lake Erie. When it is considered that he was a citizen of Pennsylvania, and only thirty years of age, it is remarkable that he should have received such an appointment.

The location of the railroad was materially changed, additional legislation was obtained, a part of the line was laid within the limits of Pennsylvania, on the Upper Delaware; and Mr. Miller continued to be the Chief Engineer for about three years, and until the work was suspended for the want of funds. The first division of the road was opened for public use while he had charge of it.

It may be remarked, in this connection, that a great change has come over the general tenor of legislation in the several States of the Union, on the subject of internal improvements.

Men change and die, but the mountain ranges remain and the streams flow on in their old channels. The arbitrary lines drawn upon the map as political divisions, cease, more and more, to act as barriers to obstruct the construction and use of railroads, which the people feel that they need to facilitate their free intercommunication, and thus the railroads of the country become one of the most powerful means of securing a more perfect Union.

After leaving the New York and Erie Road, Mr. Miller returned to Philadelphia, and became President of the Harrisburg and Lancaster Company, which post he held for two years, and while holding it he visited England as financial agent of the Company. In 1845 he was the Chief Engineer of the enlargement of the Schuylkill Navigation, a work by which the tonnage of the boats upon the Schuylkill River and Canal has been considerably more than doubled.

On the 18th April, 1845, Edward Miller was elected a member of the American Philosophical Society.

In 1856, the Pennsylvania Railroad Company was chartered. The prompt construction of a continuous railroad from Philadelphia to Pittsburgh was demanded by public opinion; and, in the face of much opposition, the City of Philadelphia, in its corporate capacity, subscribed five millions of dollars to the stock of the company.

Mr. John Edgar Thomson, now the distinguished President of that powerful and prosperous corporation, was appointed its Chief Engineer. Mr. Thomson is a native of Pennsylvania, born in Delaware county, and his great success as a railroad engineer in Georgia, recommended him for his new post of professional honor and responsibility. How worthily he was to fill it is best shown by the annual reports of the Pennsylvania Railroad Company for the last twenty-five years. Edward Miller became the Associate Engineer of the Western Division, the most difficult part of the line, and under his supervision the surveys and location of the road from Altoona to Pittsburgh were made, under Mr. Thomson as Chief Engineer. After Mr. Thomson became President of the Company, Mr. Miller succeeded him as Chief Engineer.

How efficiently these gentlemen aided each other, and thus promoted

the great interests confided to their care ; with what freedom from professional jealousies they acted, and what magnanimity characterized their intercourse, is well known to the writer of this imperfect tribute to the memory of one whose loss we now deplore, and who considers it to be a worthy example to young men entering upon the arduous life of a Civil Engineer.

Mr. Miller remained in the service of the Pennsylvania Railroad Company for about six years, and in 1852 he visited England on business of that corporation.

In February, 1853, he became the Chief Engineer of the North Pennsylvania Railroad, and continued upon that line until June, 1856, in that year being President of the Company. He located the railroad from Philadelphia to Bethlehem, and part of it was completed while under his charge. A continuous line was also located from Bethlehem to the State line of New York at Waverley, and various other surveys were made to the Delaware Water Gap and elsewhere.

In 1856, Edward Miller removed to Missouri, having been appointed Chief Engineer of the Pacific Railroad of that State. He held that post for a few years ; and, having gone to reside on a large farm near the Missouri River, about six miles from the Kansas line, the war broke out, and he found himself with a large family in a position of great peril. The progress of the railroad had stopped, and a terrible, irregular warfare filled all Western Missouri with fear. After enduring the evils of this position for a time, Mr. Miller returned to Philadelphia, leaving that home in the West which he had done much to improve, and which had for a while lost its value.

Although many millions of dollars had been disbursed under his direction on various public works, his accumulations, after many years of labor, had not been large. He was proud of his profession, looking upon it as the art of directing the great sources of power in nature to the use and benefit of man, and he considered the Civil Engineer to be not only the interpreter between the man of science and the mechanic, but also a captain of industry, bound in honor to set a good example to those working under him of all uprightness and integrity.

He had reached the age of fifty years, and he felt the importance of making a more adequate provision for his family. Through the kind assistance of Mr. John Edgar Thompson, he became a partner in a large contract for the completion of the Philadelphia and Erie Railroad, which proved to be profitable, and he was afterwards interested as a contractor on the Warren and Franklin and Kansas and Pacific Railroad. The favorable results of these undertakings enabled him to leave his family in easy circumstances.

In January, 1871, he was sixty years old, and about that time he found himself suffering from serious disease, the symptoms of which had begun to develop themselves some time before. An internal tumor, of a cancerous nature, was found to exist and to be increasing, and the resources of

medical science and skill failed to remove it. He lived for about a year, after the nature of his disease became known to him, and at times he suffered great pain. In the latter part of the time he could take but little food, and his strong frame, more than six feet in height, became very much emaciated. He was nursed with the tenderest care ; and a supply of the bark of the Cundurango plant from South America was obtained for him, which has been highly spoken of as a remedy for cancerous diseases, but which failed in this case.

The Christian character of Edward Miller was beautifully exhibited in his last illness, and he was a fine example of "the power of religion upon the mind in retirement, affliction, and at the approach of death." He had long been a member and an elder of the Presbyterian Church. Although a person of very positive opinions, and free in the expression of them, he was a broad-minded man, and some of his nearest friends were not of his religious communion. At the last, he passed away serenely to his final rest, full of Christian faith and hope.

He died on the first of February, 1872, in the sixty-second year of his age, at his house in West Philadelphia, and was buried at Woodlands Cemetery.